Chapter 5
Idaho Snake River Steelhead
Status and Recovery

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5.1 Introduction/Overview

This chapter charts a course that will allow us to achieve viability for the two Idaho Snake River steelhead major population groups: the Clearwater River MPG and the Salmon River MPG. By strategically targeting recovery efforts hierarchically at the population and MPG levels, and at each life stage, we believe we can regain viability for the Idaho MPGs, thereby contributing to recovery of the Snake River steelhead Distinct Population Segment (DPS), the scale at which listing and delisting occurs under the ESA.

Discussions in this chapter for each MPG identify:

1. viable scenarios — where we need to go to get to recovery;
2. current status — where we are today based on the ICTRT's (2007) viability criteria discussed in Chapter 3;
3. the "gap" — the distance that needs to be bridged to achieve viability;
4. limiting factors and threats — conditions that hinder viability and need to be addressed;
5. strategies and actions — activities designed to achieve recovery by addressing the limiting factors; and
6. population-level needs — recovery needs and actions specific to each population within an MPG.

While our course for recovery reflects an all-H (Habitat, Hydro, Harvest, and Hatcheries) approach, this Plan focuses primarily on addressing the local factors that are specific to the MPGs and populations. In general, regional-level concerns, and the actions to address them, apply to all the MPGs and populations in a similar manner because they occur in shared downstream environments, such as the mainstem Snake and Columbia Rivers, the estuary, and the ocean. In contrast, actions that occur at the local level are generally tailored to specific, population-level problems that lend themselves to case-by-case solutions. Section 5.1.1 summarizes the regional-level issues. Local-level actions are discussed in Section 5.2 for the Clearwater MPG and Section 5.3 for the Salmon River MPG. Regional and local factors must be addressed in concert, and in an integrated way because of the steelhead's complex life cycle and the many changes that have taken place in the environment.

Recovery actions implemented for the Idaho Snake River steelhead populations, along with those implemented in Oregon and Washington, will collectively achieve recovery of the species. For full detail of the recovery strategies for Snake River steelhead populations in Oregon and Washington, please see their respective management unit plans or the comprehensive Snake River Recovery Plan.

5.1.1 Summary of Regional Issues across Idaho Steelhead MPGs

The following regional-level issues generally apply to all Idaho Snake River steelhead MPGs and populations in a similar manner because they affect the populations in the mainstem Snake and Columbia Rivers, the estuary, and the ocean. Climate change is discussed here because it poses similar concerns for all populations and MPGs. The Estuary, Hydro, Hatchery and Fishery modules provide more detailed discussions.

Mainstem Columbia and Snake Rivers Hydropower System

Idaho Snake River steelhead pass eight mainstem Columbia and Snake River dams on their journey to the ocean and back. These dams are part of the Federal Columbia River Power System (FCRPS), which includes 31 federally owned multipurpose dams on the Columbia and its tributaries. Three U.S. government agencies – the BPA, the U.S. Army Corps of Engineers and the Bureau of Reclamation, also called, collectively, the "action agencies" – collaborate to run the FCRPS under various congressional authorities, as a coordinated system for power production and flood control. The FCRPS provides about 60 percent of the Northwest's hydroelectric generating capacity and the dams supply irrigation water to more than a million acres of land in Washington, Oregon, Idaho and Montana. The Columbia River also supports barge navigation from the Pacific Ocean to Lewiston, Idaho, 465 miles inland. Development and operation of the FCRPS have affected Columbia River basin anadromous salmon and steelhead viability.

The eight dams on the Columbia and Snake Rivers selectively impact all migrating Snake River steelhead adults and juveniles. The dams establish a thermal barrier in the reservoirs behind the dams that delays and potentially induces some mortality of migrating adults early in the migration season. Changes in flow and temperature patterns associated with the dams likely inhibit juvenile out-migration in late spring, as temperatures rise and flows decrease, causing increased travel time, increased energy expenditure and greater physiological stresses. The Hydro Module (NMFS 2008) describes these and other impacts in detail and identifies actions to address them. The Hydro Module is available on the NMFS Web site: http://www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/Other-Documents.cfm.

Hatcheries

Hatchery programs across the Columbia Basin can affect Idaho Snake River steelhead. Hatcheries have produced fish in the Columbia River Basin for more than one hundred years. Today, fish produced in hatcheries comprise the vast majority of annual returns to the Columbia Basin (CBFWA 1990; NMFS 2010). Stray hatchery fish that spawn with natural-origin steelhead pose a risk to the productivity and genetic characteristics of the natural populations. Hatchery fish also affect natural populations by competing for limited food and habitat, and by transferring diseases. The situation is complex, however, because several populations may have expired without the help of hatchery supplementation. Further, the existence of locally derived hatchery stocks may help natural populations bridge periods of adverse environmental conditions (as occurred in the 1990s).

This Plan discusses impacts from hatcheries in the MPGs and proposes actions to address them. The Hatchery Module provides a detailed discussion on the role of hatcheries, the impact of hatchery programs on recovery efforts, and approaches underway to minimize these impacts. The Hatchery Module (coming soon) will be available on the NMFS Web site: http://www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/Other-Documents.cfm.

Fisheries

Snake River steelhead encounter fisheries in the ocean, Columbia River estuary, mainstem Columbia, Snake River, and Salmon River as they complete their migration from the ocean back to natal streams. The steelhead are currently harvested in tribal fisheries and mainstem recreational fisheries, and there is incidental mortality associated with mark-selective recreational fisheries. The majority of impacts on the summer steelhead run occur in tribal gillnet and dip net fisheries targeting Chinook salmon. Because of their larger size, the B-run steelhead are more vulnerable to the gillnet gear. Consequently, the B-run component of the summer steelhead run experiences higher fishing mortality than the A-run component (Ford et al. 2010).

The different fisheries adhere to the guidelines and constraints of the Pacific Salmon Treaty, the Columbia River Fish Management Plan, the Endangered Species Act administered by NMFS, the Pacific Fishery Management Council, the states of Oregon, Washington, and Idaho, the Columbia River Compact, and management agreements negotiated between the parties to U.S. v. Oregon. Negotiations between the different fishery managers in recent years have significantly reduced mortality rates on natural origin steelhead. The cumulative effect of the changes made to Columbia River mainstem and tributary fisheries is that the total exploitation rate for Columbia River salmon and steelhead has declined, especially since the 1970s.

The Fishery Module discusses the fisheries-related concerns in more detail and describes actions to address them. In general, fishery impacts on Snake River steelhead are considered very low risk for each of the individual populations (ICTRT 2007). The Fishery Module (coming soon) will be available on the NMFS Web site: http://www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/Other-Documents.cfm.

Estuarine and Plume Habitat

Historically the Columbia River estuary contained rich habitat for juvenile salmonid growth and survival, including a close proximity to high-energy areas with ample food availability and sufficient refuge habitat. Today many of these once important estuarine habitat areas show the effects of land and water management activities. Channelization, diking, development, and other practices along the lower Columbia River led to the loss or modification of complex habitats. Jetties, pile dikes, tide gates, docks, breakwaters, bulkheads, revetments, seawalls, groins, ramps and other structures have changed circulation patterns, sediment deposition, sediment erosion, and habitat formation in the estuary (Williams and Thom 2001).

Changes in habitat conditions lowered fish productivity in the estuary (Bottom et al. 2005). The historic macrodetrital-based food web was composed of plant materials originating from emergent forested and other wetland areas in the estuary, and was spread evenly throughout the estuary. The estuary's current food web is microdetrital-based, which is less productive since it consists of decaying phytoplankton delivered from upstream reservoirs.

Land and water development activities in the Columbia River basin also led to reduced water quality in the estuary. High water temperatures and contaminants from agricultural, urban and industrial practices also affect the viability of Snake River steelhead and other species. Contamination affects steelhead through short-term exposure to lethal substances or through longer exposures to chemicals that accumulate over time and magnify through the food chain.

Although they pass through the estuary on their way to the ocean, juvenile steelhead are less likely to frequent the shallow parts of the estuary, preferring deeper estuarine waters. Therefore, the characteristics of these deeper channels, and the Columbia River plume, may be more important in determining their survival. The Estuary Module (NMFS 2007) discusses these impacts in more detail and describes steps to address them. The Estuary Module is available on the NMFS Web site: http://www.nwr.noaa.gov/Salmon-Recovery-Planning/ESA-Recovery-Plans/Other-Documents.cfm.

Predation and Competition

Predation by pinnipeds, birds, and piscivorous fish in the mainstem Columbia River, while probably always a significant source of mortality for salmonids, has increased to the point that it is now a contributing factor limiting the viability of Idaho Snake River steelhead. Ecosystem alterations attributable to hydropower dams and changes in the hydro system, and to modification of estuarine habitat, have increased predation on the populations. The number and/or predation effectiveness of Caspian terns, double-crested cormorants, and a variety of gull species in the estuary has increased due to habitat modification (LCREP 2006; Fresh et al. 2005). In 1997, avian predators consumed an estimated 10 to 30 percent of the total estuarine salmonid smolt production in that year (LCREP 2004). The draft 2005 Season Summary of Research, Monitoring, and Evaluation of Avian Predation on Salmonid Smolts in the Lower and Mid-Columbia River (Collis and Roby 2006) estimates that terns consumed 3.6 million juvenile salmonids in 2005. Stream-type juvenile salmonids, such as steelhead, are most vulnerable to avian predation by Caspian terns because the juveniles use deep-water habitat channels that have relatively low turbidity and are close to island tern habitats.

Non-salmonid fish and marine mammals also prey on summer steelhead. Northern pikeminnows congregate below Bonneville Dam and at hatchery release sites to feed on smolts. Introduced exotic fish species, such as smallmouth bass, thrive in the Bonneville Pool and prey on juveniles concentrated by the dam. Marine mammals (pinnipeds or sea lions) prey on migrating adult salmon and steelhead in the lower Columbia River and as they attempt to pass over Bonneville Dam (USACE 2007).

In addition, competition among salmonids, and between salmonids and other fish, may occur in the estuary. The intensity and magnitude of competition depends in part on how long hatchery and natural juvenile salmonids reside in the estuary (LCFRB 2004). Competition likely escalates when large numbers of salmonids inhabit the estuary at the same time and require similar habitat conditions and food. The Estuary Module (NMFS 2007) discusses these impacts in more detail and identifies actions to address them. Predation concerns in natal tributaries, including by non-native brook trout, are discussed later in this chapter at the MPG level.

Climate Change

Likely changes in temperature, precipitation, wind patterns, and sea level height due to climate change have profound implications for survival of Snake River steelhead populations. All other threats and conditions remaining equal, future deterioration of water quality, water quantity, and/or physical habitat due to climate change can be expected to cause a reduction in the number of naturally produced adult Chinook returning to populations across the ESU. This possibility reinforces the importance of maintaining habitat diversity and achieving survival improvements throughout the entire life cycle.

Briefly, as the climate changes air temperatures are expected to continue to rise 0.1-0.6 °C per decade, which will translate to a <1 °C increase in Columbia basin water temperatures by the 2020s, and a 2-8

°C increase by the 2080s. While total precipitation changes are predicted to be minor (+1-2%), increasing air temperature will result in more precipitation falling as rain rather than snow. With this change, snow pack will diminish, more winter flooding will occur in transitional and rainfall-dominated basins, and historically transient watersheds will experience lower late summer flows. While the magnitude and timing of resulting biological effects are poorly understood at present, and specific effects are likely to vary among populations, the biological consequences are generally predicted to be negative, including changes in distribution, behavior, growth, migration characteristics, and survival. One modeling study predicts an 18-34 percent reduction in parr-to-smolt survival by 2040 for some populations of Snake River spring/summer Chinook because of higher late-summer water temperatures and lower flows (Crozier et al. 2008).

Climate change is also affecting the estuarine and marine environments, resulting in increasing sea temperatures, sea level height, and ocean acidity. These factors are also expected to have negative consequences by restricting available habitat, altering prey survival and productivity, and possibly altering salmon and steelhead migration patterns, growth, and survival. Details of the effects of climate change on Columbia River Basin salmon and steelhead are reviewed in ISAB (2007) and NMFS (2010).

The ISAB (2007) developed recommendations to incorporate climate change considerations into restoration and recovery planning and suggested actions to reduce climate change impacts on Columbia Basin salmon and steelhead. This recovery plan adopts the ISAB's general strategy and recommendations.

For freshwater tributary habitat, there is a three-pronged general strategy:

1. Minimize increases in summer temperatures in affected streams by implementing measures to retain shade along stream channels and augment summer flow.
2. Help alleviate both elevated temperatures and low stream flows in affected streams during summer and autumn by managing water withdrawals to maintain as high a summer flow as possible.
3. Provide mitigation for declining summer flows by protecting and restoring wetlands, floodplains, or other landscape features that store water.

The ISAB also proposes actions to reduce climate change impacts in the mainstem Columbia/Snake corridor, estuary and plume. For the mainstem Columbia/Snake corridor, the strategy includes releasing cool water from reservoirs during critical times, improving juvenile passage through warm dam forebays, improving temperatures in adult fish passage structures, and reducing warm-water predators. For the estuary, removing dikes to open backwater, slough, and other off-channel habitats can increase flow through these areas and encourage hyporheic flow. The climate change strategy for salmon and steelhead in the oceans is primarily to review mechanisms for timing arrival of smolts to avoid a mismatch with marine predators and prey and to review harvest practices to ensure that harvest quotas are adjusted to reflect changing conditions. The climate change strategy necessitates a strong monitoring and evaluation program, along the lines of that included in the FCRPS Adaptive Management Strategy, to detect physical and biological changes associated with climate change and to determine the efficacy of responsive measures.